UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/066,168	04/24/1998	MIKIO KATSUBE	10089/4	8473

26646 7590 04/09/2003

KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER
FORTUNA, ANA M

ART UNIT	PAPER NUMBER
1723	30

DATE MAILED: 04/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS

AND INTERFERENCES

Paper No. 30

Application Number: 09/066,168

Filing Date: 24 April, 1998

Appellant(s): Katsube, et al.

KATSUBE et al.

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 1/22/2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1, 2, 5, 6, stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CAR 1.192(c)(7). Applicant's recognize that the claims above stand or fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

4,293,419	Sekino et al.	10/1981
5,160,042	Bikson et al.	11/1992
5,380,433	Ethienne et al.	1/1995

Matsuura, Takeshi, "Synthetic Membranes and Membrane Separation Processes", CRC Press, 1994

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The factual inquiries set forth in *Graham v. John Deer Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekino et al (4,293,419)('419) in view of Bickson et al (5,160,042)('042), Ethienne et al (5,380,433)('433) and Matsuura (Synthetic membrane and membrane separation process, page 314). Reference '419, of record, disclose the double bundle hollow fiber membranes (elements 12 and 12', figures). Regarding claim 1, the feed tube (11, 11'), the connecting conduit (6), the container having the wall and end wall (2 and 2'), and the permeate discharge (10 and 10') is also disclosed. '419 fails to disclose the feed provided at one end of the container, and the retentate discharge proximal to the end of the container, however, discloses discharging the concentrate at the end of one of the modules (elements 7 and 9). '419 also fails to disclose feeding the module or positioning the feed entrance to the feed tube at the end walls of the housing, feeding though a central perforated pipe (Fig. 1, elements 8, 11) is disclosed. Reference '042 teaches hollow fiber membrane

modules having the inlet to the central perforated feed tube at the end of the container, e.g. axially to the central perforated pipe (element 10, figures 1 and 5). Reference '042 also teaches placing the retentate outlet (2) at any position of the container wall (column 8, lines 29-50, column 9, lines 31-36). Based on the teaching of '042, it would have been obvious to one skilled in the art at the time the invention was made to arrange the apparatus of '419, including the axially aligned hollow fiber bundles, to open the feed and retentate outer as suggested in reference '042, e.g. feeding at the end of the housing, through the central pipe, and removing retentate (concentrate) through a lateral opening in communication with the outside of the bundle of hollow fibers. Furthermore, the location of the discharge (of retentate or concentrate) in the module of '419 is not critical, due to the lack of pressure loss in the housing, and therefore not substantial solid accumulation at the end of the housing (abstract) is expected. One skilled in the art at the time the invention was made would have been motivated to place the discharge at the end of the housing axially or through the container wall.

Reference '433 and Matasuura are **cumulative** as showing bundles provided within a housing having lateral retentate (concentrate) discharge positioned substantially at the end of the housing and passing through the container wall. Reference '433 (Ethienne et al) further teaches feeding a hollow fiber bundle axially, and collecting the residue or retentate through an outlet at the end of the container (elements 30 and 15), the positioning of the residue outlet at the end or substantially at the end of the housing suggests removing the retentate (residue or concentrated) at the end of the container, and not at the center as in reference '419, positioning the discharge axially or laterally at the end of the container does not affect the residue or retentate discharge, when both discharge conduits are in direct contact with the solid or residue accumulated area. '433 also discloses discharge for permeate through the container wall (element 38). It would have

been obvious to one skilled in the art at the time the invention was made to adapt the device of reference '419 to remove the residue or retentate at the end of the housing, as suggested by reference '433, and further place the residue or retentate discharge at one side of the housing, e.g. through the container wall, as suggested in reference '042, since in the apparatus of '419 the positioning of the lateral discharge at the end of the housing is not critical.

Matsuura teaches housing for hollow fiber modules having the retentate discharge provided at one end of the housing and through the housing wall, hollow fiber membrane bundle surrounding a perforated feed pipe, and permeate discharge (Fig. 7.10- 7-11 , page 314). It would have been obvious to one skilled in the art at the time the invention was made to modify a hollow fiber membrane module by providing the retentate discharge at the end of the module and in contact with the retentate space or space between the hollow fiber bundle and the inner wall of the housing or container, as suggested by Matsuura, or as suggested by Bickson, since Bickson suggest location at any position avoiding build up of pressure (column 8, lines 29-34). The build up of pressure is conventionally caused by solid accumulation in the housing. It would have been also obvious to one skilled in the art at the time the invention was made to adjust the retentate discharge of the modules such that they can be used in conventional housings, as the housing disclosed by Matsuura.

Response to Arguments

3. Applicant's arguments filed on 1/22/2003 have been fully considered but they are not persuasive. Regarding arguments about Sekino ('419) Applicant's acknowledge the problem resolved by '419, e.g. the reduction in pressure loss by selecting modules connected axially within a housing as described in the

discussion of '419 above, and further discussed the problem discussed by '419, e.g. the concentration polarization (solid concentration in the area of low pressure, being greater at the end of the housing away from the feed) in larger housing due to the loss of pressure within the housing. Applicant's also argue about the positioning of the retentate discharge "at a discovered location " minimizing pressure loss in the membrane module (see limitation of claim 1, last four lines). The discussion of reference '419 clearly teache one skilled in the art at the time the invention was made that the mayor solid accumulation occurs at the end of the housing in a large housing, and therefore a large accumulation of solids. Reference '419 placed the retentate discharge at a certain distance from the end of the housing and through the container wall, however this position is not critical in his membrane modules arrangement, because of the lack of pressure loss. One skilled in the art it would have been motivated to place the retentate discharge at any position with respect to the end of the module, since this position is not critical, however, in the case of pressure loss and solid accumulation due toe concentration polarization, one skilled in the art at the time the invention was made would have been motivated to place the discharge of concentrate or retentate at the end of the housing, e.g. to remove larger amount of solids caused the concentration polarization effect. Reference '042 clearly suggests feeding at the end of the housing, through a perforated pipe and discharging through and exit passing through the housing wall and located at any position with expect to the end of the housing (Fig. 2, elements 10, 2, column 8, lines 29-34).

Reference to Matsuura et al evidence conventional hollow fiber modules with discharge at the end of the housing (where the solids accumulate) when pressure loss occurs within the housing, in particular, large or high length housings.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Ana Fortuna

Primary Examiner

AU 1723

ANA FORTUNA
PRIMARY EXAMINER

Conferees

Michael Ball

SPE AU 1733

Wanda Walker

AU 1723